

CLAIMS

1. An apparatus for use in processing a substrate, comprising:
a brush enclosure extending over a length, the brush enclosure configured to be disposed over a surface of the substrate, the brush enclosure having an open region that is configured to be disposed in proximity to the substrate, the open region enabling foam from within the brush enclosure to contact the surface of the substrate when the substrate is present, the open region extending over the length of the brush enclosure.
2. The apparatus of claim 1, further comprising:
a first flange extending from the brush enclosure along the length and along a first side of the open region; and
a second flange extending from the brush enclosure along the length and along a second side of the open region.
3. The apparatus of claim 2, wherein the first and second flanges define surfaces that are configured to be substantially parallel to the surface of the substrate when the substrate is present.
4. The apparatus of claim 1, wherein the brush enclosure has a tubular shape.
5. The apparatus of claim 1, wherein the brush enclosure is defined from a chemically inert material.

6. The apparatus of claim 5, wherein the chemically inert material is defined by one or more of plastic, Delrin, polyvinylidene fluoride (PVDF), and polyethylene terephthalate (PET).

7. The apparatus of claim 1, wherein the length of the brush enclosure is configured to extend a length of a brush.

8. A brush enclosure for use in processing a substrate, comprising:
an elongated enclosure configured to enclose a brush, the elongated enclosure being configured to be disposed above a surface of the substrate, the elongated enclosure having opposite ends defining a length and having an open region along the length of the elongated enclosure, the open region configured to be disposed above the surface of the substrate enabling a surface of the brush when the brush is present to make contact with the surface of the substrate when the substrate is present.

9. The brush enclosure of claim 8, further comprising:
a flange along the length of the elongated enclosure extending radially outward from an outer surface of the elongated enclosure, the flange defining a surface being substantially parallel to the surface of the substrate when the substrate is present.

10. The brush enclosure of claim 9, wherein a space between the surface of the flange and the surface of the substrate when the substrate is present defines a gap, the gap enabling production of jammed foam.

11. The brush enclosure of claim 10, wherein the gap has a dimension from about 0.1 mm to about 5 mm.
12. The brush enclosure of claim 9, wherein the flange has a conduit configured to remove liquid resulting from collapse of jammed foam from the surface of the substrate when the substrate is present.
13. The brush enclosure of claim 8, wherein the elongated enclosure has a tubular shape.
14. The brush enclosure of claim 8, wherein the elongated enclosure is defined from a chemically inert material.
15. The brush enclosure of claim 14, wherein the chemically inert material is defined by one or more of plastic, Delrin, polyvinylidene fluoride (PVDF), and polyethylene terephthalate (PET).
16. The brush enclosure of claim 8, wherein the length of the brush enclosure is configured to extend a length of a brush.
17. The brush enclosure of claim 8, wherein the open region extends over the length of the elongated enclosure.
18. A substrate cleaning system, comprising:
a first brush enclosure;

a first brush partially enclosed within the first brush enclosure, the first partially enclosed brush being configured to be disposed above a surface of a substrate;

a first drive roller; and

a second drive roller, the first and second drive rollers being configured to receive an edge of the substrate to support and rotate the substrate when placed below the first partially enclosed brush.

19. The substrate cleaning system of claim 18, further comprising:

a second brush enclosure;

a second brush partially enclosed within the second brush enclosure, the second partially enclosed brush being oriented relative to the first partially enclosed brush configured to receive the substrate between the first and second partially enclosed brushes.

20. The substrate cleaning system of claim 18, further comprising:

a housing, the housing being configured to enclose the substrate cleaning system.

21. A method for cleaning a substrate, comprising:

providing foam to a surface of the substrate;

brush scrubbing the surface of the substrate;

providing pressure to the foam; and

channeling the pressured foam to produce jammed foam,

wherein the method operations of brush scrubbing the surface of the substrate and channeling the pressured foam across the surface of the substrate facilitate particles to be removed from the surface of the substrate.

22. The method of claim 21, further comprising:
chemically treating the surface of the substrate with the foam, the chemical treatment facilitating the particles to be removed from the surface of the substrate.
23. The method of claim 22, wherein the method operation of chemically treating the surface of the substrate with the foam includes,
rupturing bubbles within the foam to release gases and liquids onto the surface of the substrate, the gases and liquids facilitating removal of the particles from the surface of the substrate.
24. The method of claim 23, wherein the gases are defined by one or more of ozone (O₃), oxygen (O₂), hydrochloric acid (HCl), hydrofluoric acid (HF), nitrogen (N₂), and argon (Ar).
25. The method of claim 23, wherein the liquids are defined by one or more of water (H₂O), deionized water (DIW), cleaning fluid, and surfactant.
26. The method of claim 21, wherein the pressure on the jammed foam creates a shear force on the jammed foam.
27. The method of claim 21, wherein the method operation of providing pressure to the foam includes,
applying gases and liquids through a brush, the application of the gases and the liquids enabling the production of pressure to the foam.

28. The method of claim 21, wherein the method operation of channeling the pressured foam to produce jammed foam includes,

channeling the pressured foam into a gap, the gap being defined by a space between a surface of a brush enclosure and the surface of the substrate.